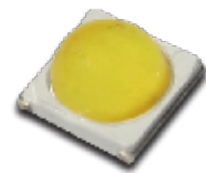


# PLCC 3535 1-3W Series Datasheet



## Features :

- Maximum drive current up to 700mA
- Low thermal resistance as low as 8 °C/W
- Wide viewing angle of 120~140 degrees
- Reflow soldering with JEDEC JSTD-020C compatible
- RoHS compliant

## Typical Applications :

- General luminaire
- Bulb
- Downlight

## Table of Contents

---

General Information .....	3
Absolute Maximum Ratings .....	4
Characteristics .....	4
Luminous Flux Characteristic.....	5
Voltage Bin Structure .....	5
Color Bin Structure.....	6
Mechanical Dimensions.....	9
Characteristic curve.....	10
Reflow Profile .....	17
Reliability.....	18
Product Packaging Information .....	19
Revision History .....	20
About Edison Opto .....	20

## General Information

### Introduction

Ultra high luminous efficacy, combined with the flexibility in design due to its slim and miniature size, PLCC LED Series are optimized to be used as lighting for signboard.

### Ordering Code Format

<u>2</u>	<u>T</u>	<u>06</u>	<u>01</u>	<u>XX</u>	<u>11</u>	<u>000</u>	<u>XXX</u>
X1	X2	X3	X4	X5	X6	X7	X8
X1	X2	X3	X4	X5			
Type	Component		Series		Wattage		Color
2	Emitter	T	PLCC	06	3535	01	1W
							CW
							NW
							WW
							Cool White
							Neutral White
							Warm White
X6	X7	X8					
Internal code	PCB Board		Serial Number				
11	-	000	-	-	-	-	

## Absolute Maximum Ratings

Absolute maximum ratings ( $T_a=25^{\circ}\text{C}$ )

Parameter	Symbol	Value	Units
Power dissipated	$P_d$	2.4	W
Forward Current	$I_F$	700	mA
Allowable peak forward current	$I_p$	1000	mA
Reverse Current	$I_R$	10	$\mu\text{A}$
Reverse Voltage	$V_R$	0.6	V
LED Junction Temperature	$T_J$	125	$^{\circ}\text{C}$
Operating Temperature	-	-40 ~ +85	$^{\circ}\text{C}$
Storage Temperature	-	-40 ~ +125	$^{\circ}\text{C}$
Electrostatic discharge threshold (HBM)	ESD	Class2	-
Soldering Temperature	$T_s$	Reflow Soldering : 255~260 $^{\circ}\text{C}$ /10~30sec Manual Soldering : 350 $^{\circ}\text{C}$ /3sec	-

Notes:

- $I_{\text{pulse}}$  measured at 1/10 duty cycle, 0.1ms pulse width.
- ESD HBM class 2 per Mil-Std-883D method 3015.

## Characteristics

Parameter	Symbol	Value	Units
Viewing Angle	(Typ.) $2\theta_{1/2}$	120	Degree
Forward voltage	(Typ.) (Max.) $V_F$	3.15 3.5	V
Thermal resistance	(Min.) (Typ.)	4 8	$^{\circ}\text{C}/\text{W}$
Temperature coefficient $V_F$	(Typ.)	-3	$\text{mV}/^{\circ}\text{C}$
CRI	(Typ.)	80	-
CCT/Wavelength	(Cool White) (Neutral White) (Warm White)	5300-7000 3700-4500 2700-3050	K
JEDEC Moisture Sensitivity	-	Level 2a <b>Floor Life</b> Conditions: $\leq 30^{\circ}\text{C}$ / 60% RH <b>Soak Requirements(Standard)</b> Time (hours): 120+1/-0 Conditions: 60 $^{\circ}\text{C}$ / 60% RH	-

Notes:

- $2\theta_{1/2}$  is the off-axis angle where the luminous intensity is half of the axial luminous intensity.
- Color Rendering index CRI tolerance:  $\pm 2$

## Luminous Flux Characteristic

Luminous Flux Characteristics,  $I_f=350\text{mA}$  and  $T_j=25^\circ\text{C}$

Color	Group	Min. Luminous Flux(lm)	Max. Luminous Flux(lm)	Typ. Luminous Flux (lm) @ 700 mA	Order Code
Cool White	V2	120	130	243	2T0601CW11000001
	V3	130	140		
	V4	140	150		
Neutral White	U3	100	110	216	2T0601NW11000001
	V1	110	120		
	V2	120	130		
	V3	130	140		
Warm White	U3	100	110	207	2T0601WW11000001
	V1	110	120		
	V2	120	130		

Note:

The luminous flux performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of  $\pm 10\%$  on flux measurements.

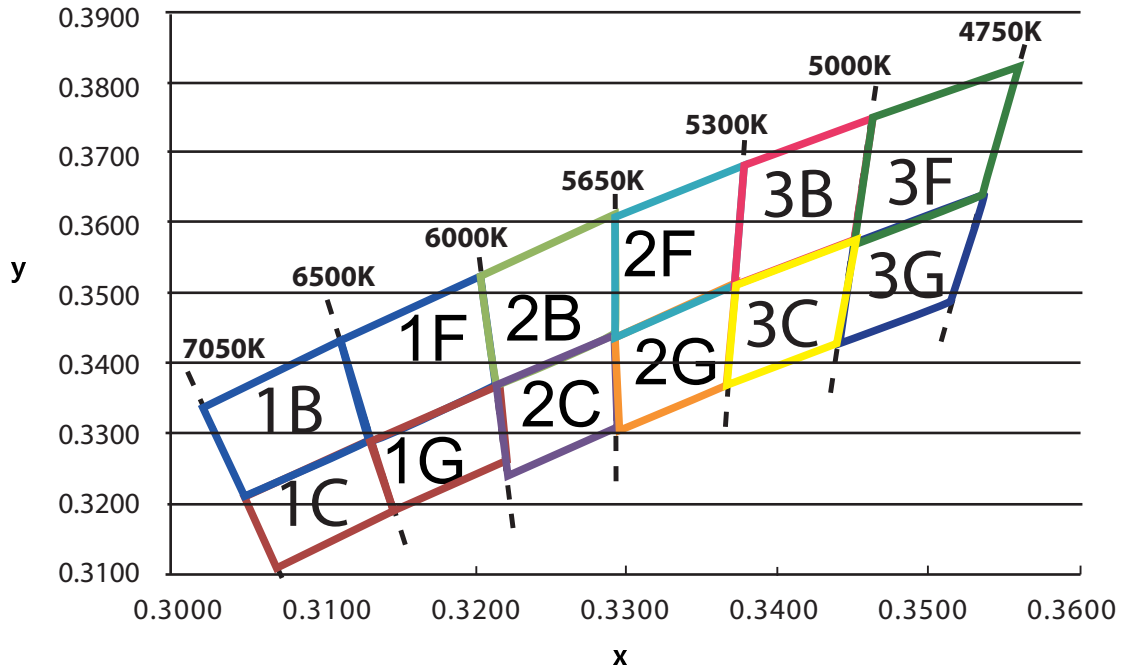
## Voltage Bin Structure

Group	Min. Voltage (V)	Max. Voltage (V)
VA1	2.8	2.9
VB1	2.9	3.0
VC1	3.0	3.1
VA2	3.1	3.2
VB2	3.2	3.3
VC2	3.3	3.4
VA3	3.4	3.5

Note:

Forward voltage measurement allowance is  $\pm 0.1\text{V}$ .

## Color Bin Structure

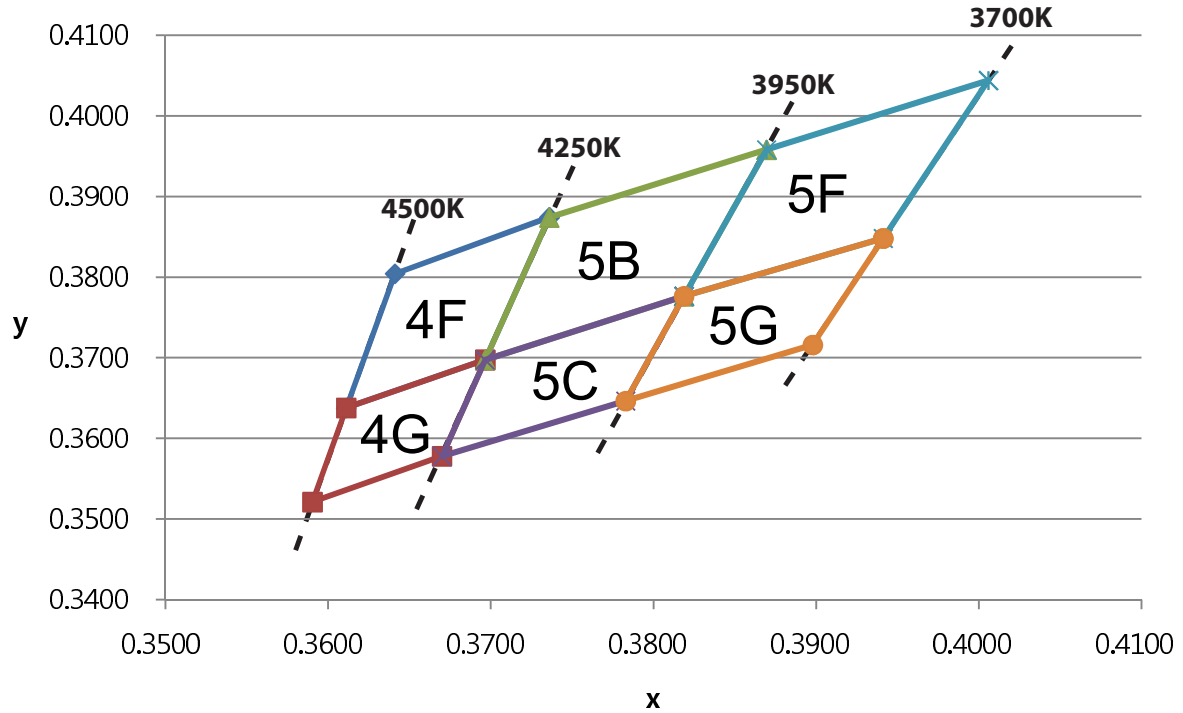


Note: Color coordinates measurement allowance is  $\pm 0.01$

Group	X	Y	Group	X	Y	Group	X	Y
1B	0.3111	0.3431	1F	0.3202	0.3520	2B	0.3292	0.3608
	0.3020	0.3335		0.3111	0.3431		0.3202	0.3520
	0.3048	0.3209		0.3131	0.3290		0.3214	0.3366
	0.3131	0.3290		0.3214	0.3366		0.3293	0.3441
1C	0.3131	0.3290	1G	0.3214	0.3366	2C	0.3293	0.3441
	0.3048	0.3209		0.3131	0.3290		0.3214	0.3366
	0.3068	0.3108		0.3145	0.3187		0.3222	0.3243
	0.3145	0.3187		0.3221	0.3261		0.3294	0.3305

Group	X	Y	Group	X	Y	Group	X	Y
2F	0.3379	0.3684	3B	0.3463	0.375	3F	0.3559	0.3820
	0.3292	0.3608		0.3379	0.3684		0.3463	0.3750
	0.3293	0.3441		0.3372	0.3511		0.3451	0.3572
	0.3372	0.3511		0.3451	0.3572		0.3535	0.3638
2G	0.3371	0.3511	3C	0.3451	0.3572	3G	0.3535	0.3638
	0.3293	0.3441		0.3372	0.3511		0.3451	0.3572
	0.3294	0.3305		0.3366	0.3369		0.3440	0.3428
	0.3366	0.3369		0.344	0.3428		0.3515	0.3487

PLCC Chromaticity diagram for Cool White

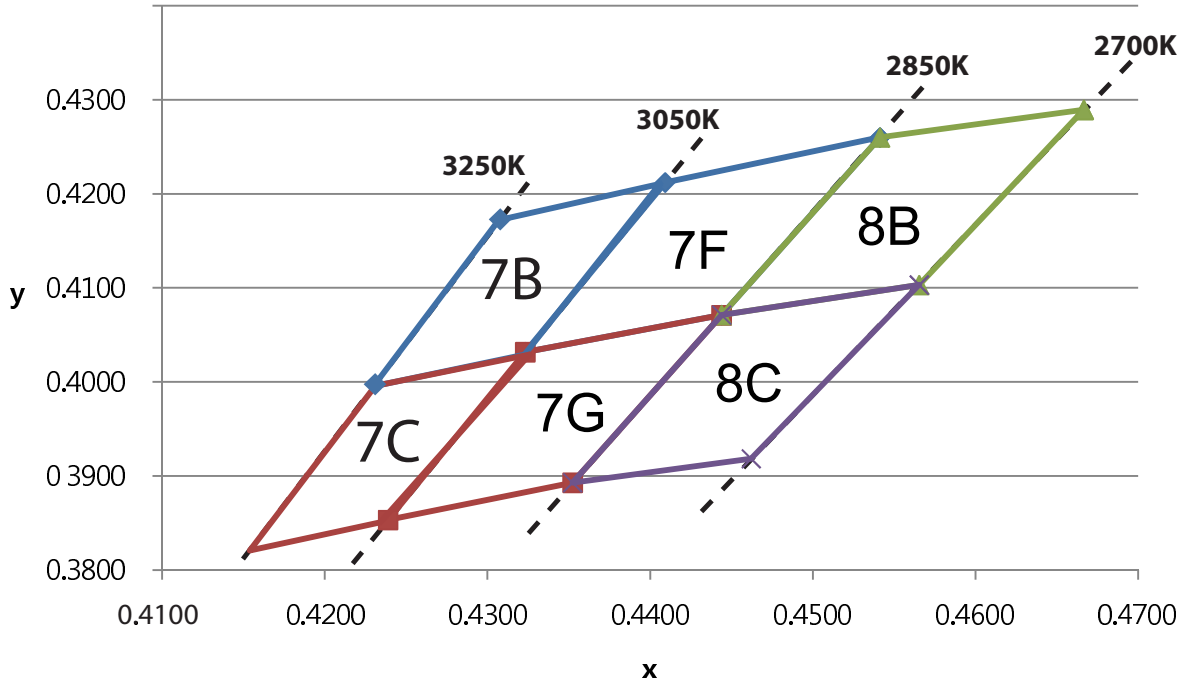


Note: Color coordinates measurement allowance is  $\pm 0.01$

Group	X	Y	Group	X	Y	Group	X	Y
4F	0.3736	0.3874	5B	0.3870	0.3958	5F	0.4006	0.4044
	0.3641	0.3804		0.3736	0.3874		0.3870	0.3958
	0.3611	0.3638		0.3697	0.3697		0.3819	0.3776
	0.3697	0.3697		0.3819	0.3776		0.3941	0.3848
4G	0.3697	0.3697	5C	0.3819	0.3776	5G	0.3941	0.3848
	0.3611	0.3638		0.3697	0.3697		0.3819	0.3776
	0.3590	0.3521		0.3670	0.3578		0.3783	0.3646
	0.3670	0.3578		0.3783	0.3646		0.3898	0.3716

PLCC Chromaticity diagram for Neutral White

Color Bin,  $T_a=25^\circ\text{C}$



Note: Color coordinates measurement allowance is  $\pm 0.01$

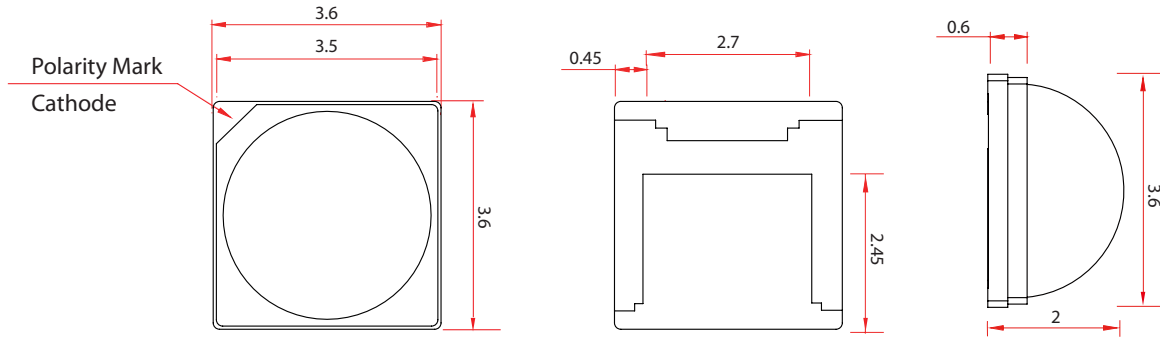
Group	X	Y	Group	X	Y	Group	X	Y
7B	0.4430	0.4212	7F	0.4562	0.4260	8B	0.4687	0.4289
	0.4290	0.4165		0.4430	0.4212		0.4562	0.4260
	0.4221	0.3984		0.4344	0.4032		0.4465	0.4071
	0.4344	0.4032		0.4465	0.4071		0.4586	0.4103
7C	0.4344	0.4032	7G	0.4465	0.4071	8C	0.4586	0.4103
	0.4221	0.3984		0.4344	0.4032		0.4465	0.4071
	0.4147	0.3814		0.4260	0.3853		0.4373	0.3893
	0.4260	0.3853		0.4373	0.3893		0.4483	0.3918

PLCC Chromaticity diagram for Warm White

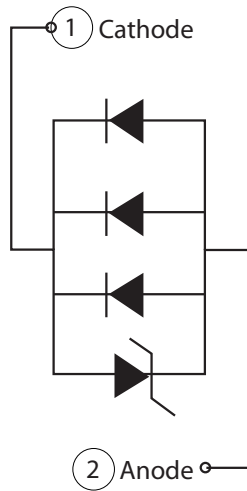


## Mechanical Dimensions

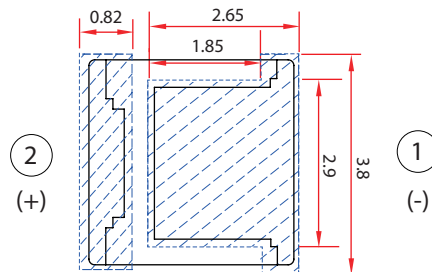
### Emitter Type Dimension



### Circuit



### Solder Pad

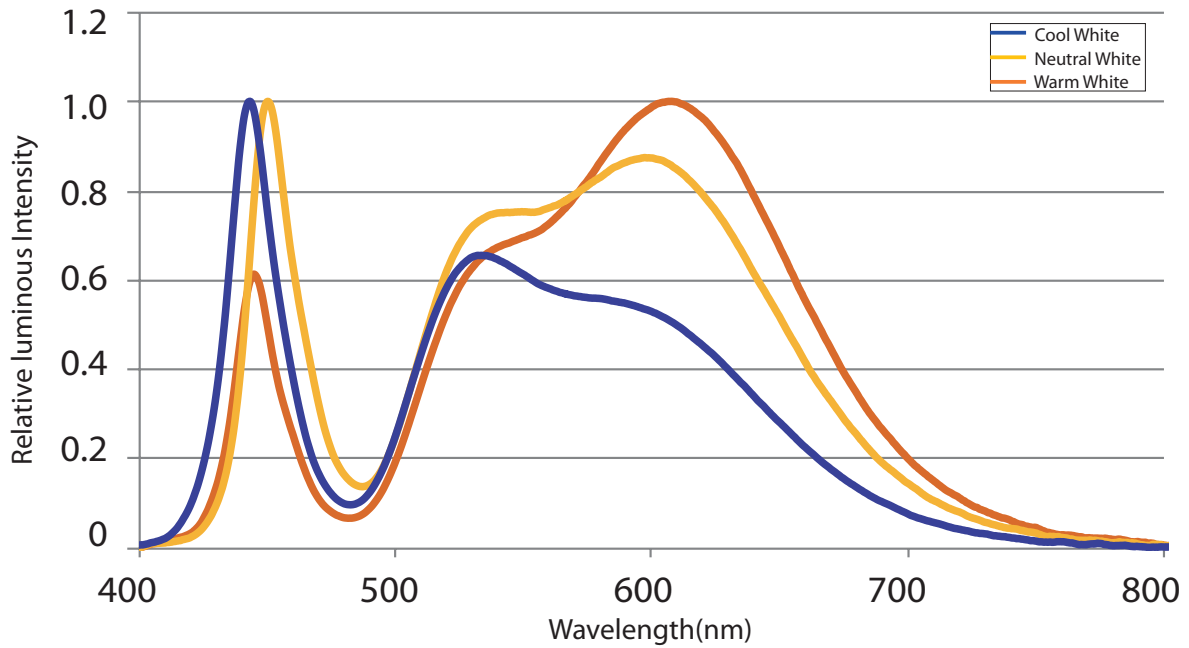


#### Notes:

1. All dimensions are measured in mm.
2. Tolerance :  $\pm 0.20$  mm.

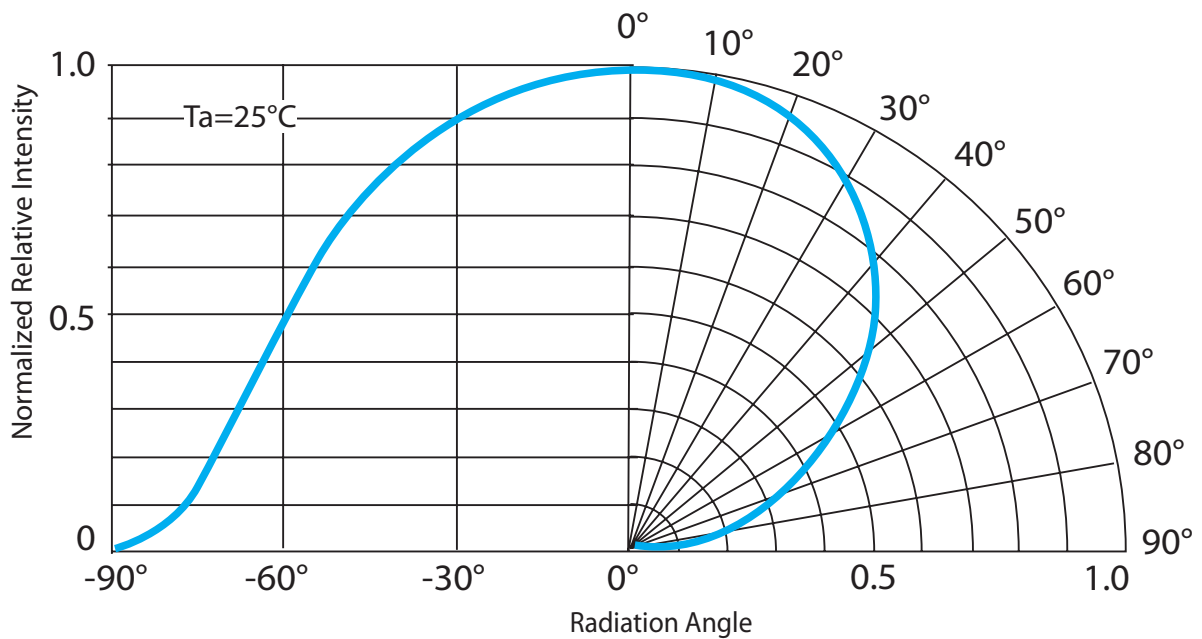
## Characteristic curve

### Color Spectrum



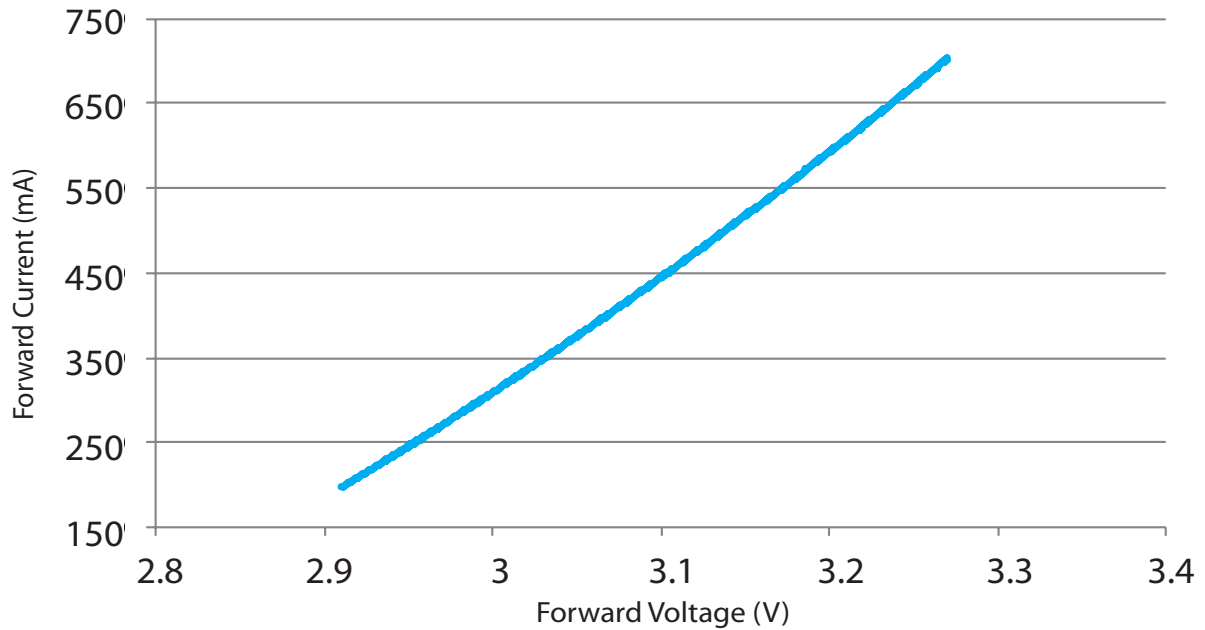
Color Spectrum at a typical CCT for PLCC 3535 1-3W Series

### Beam Pattern



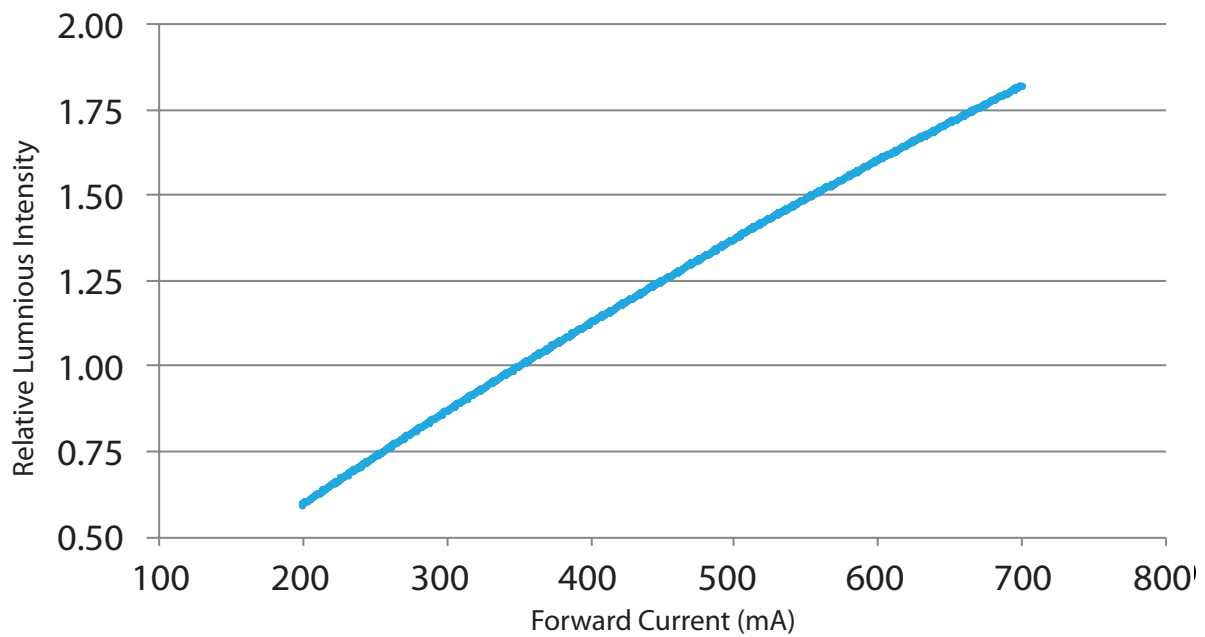
Beam pattern diagram for PLCC series

### Forward Current vs. Forward Voltage



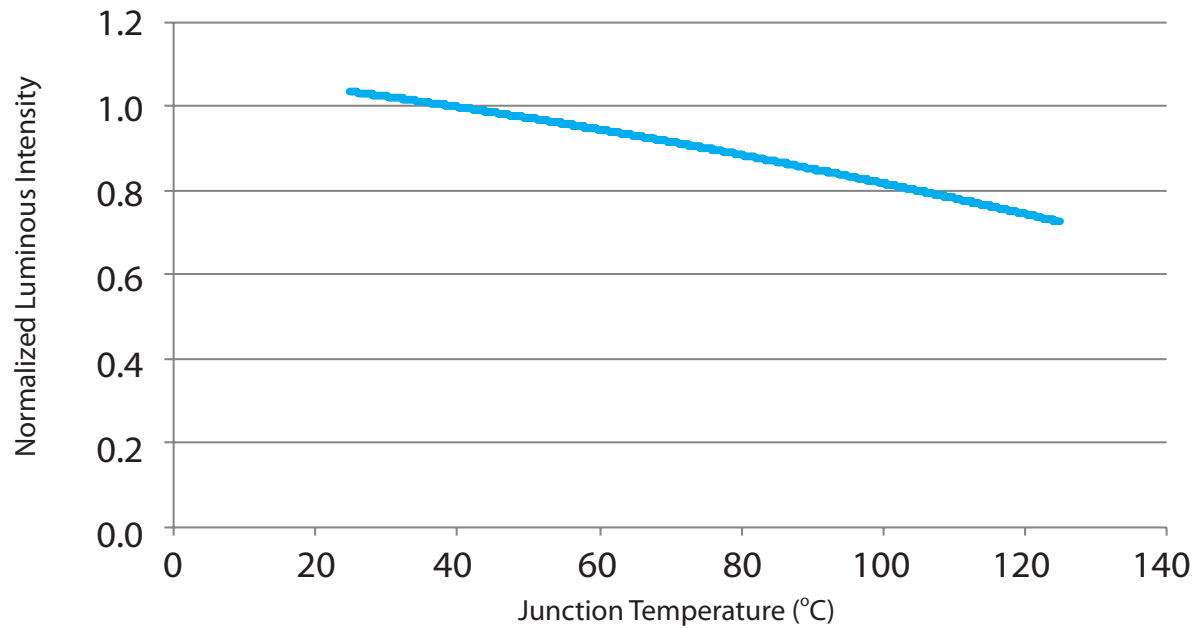
Forward Current vs. Forward Voltage for PLCC 3535 1-3W Series

### Relative Intensity vs. Forward Current



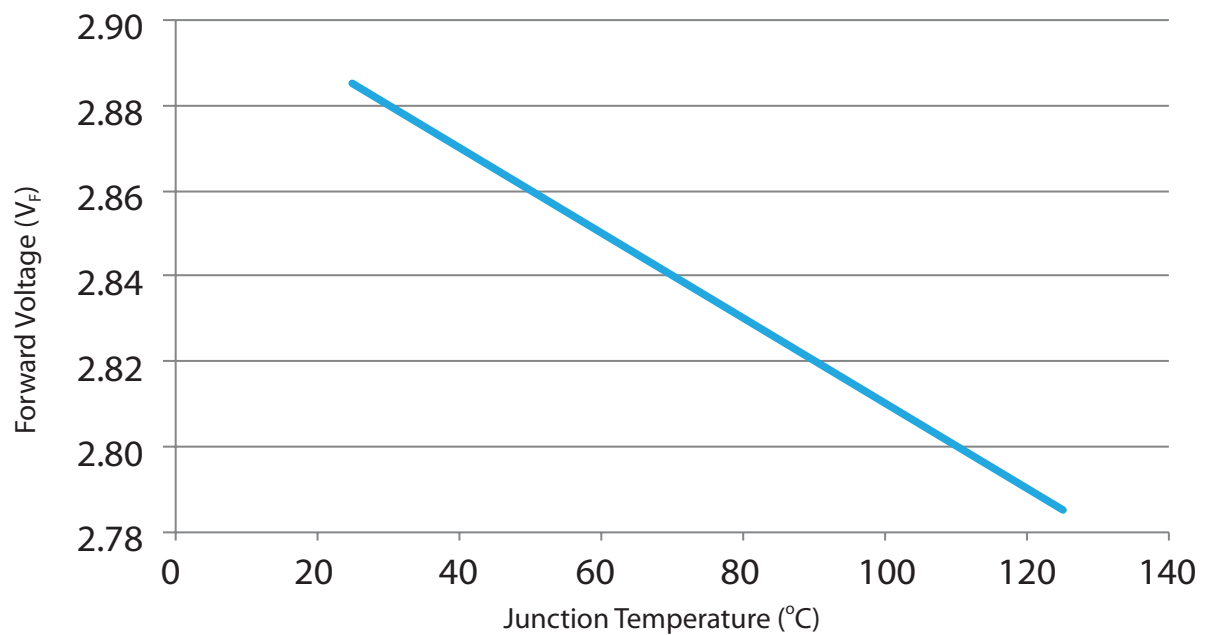
Luminous Intensity vs. Forward Current for PLCC 3535 1-3W Series

### Luminous Flux vs. Junction Temperature



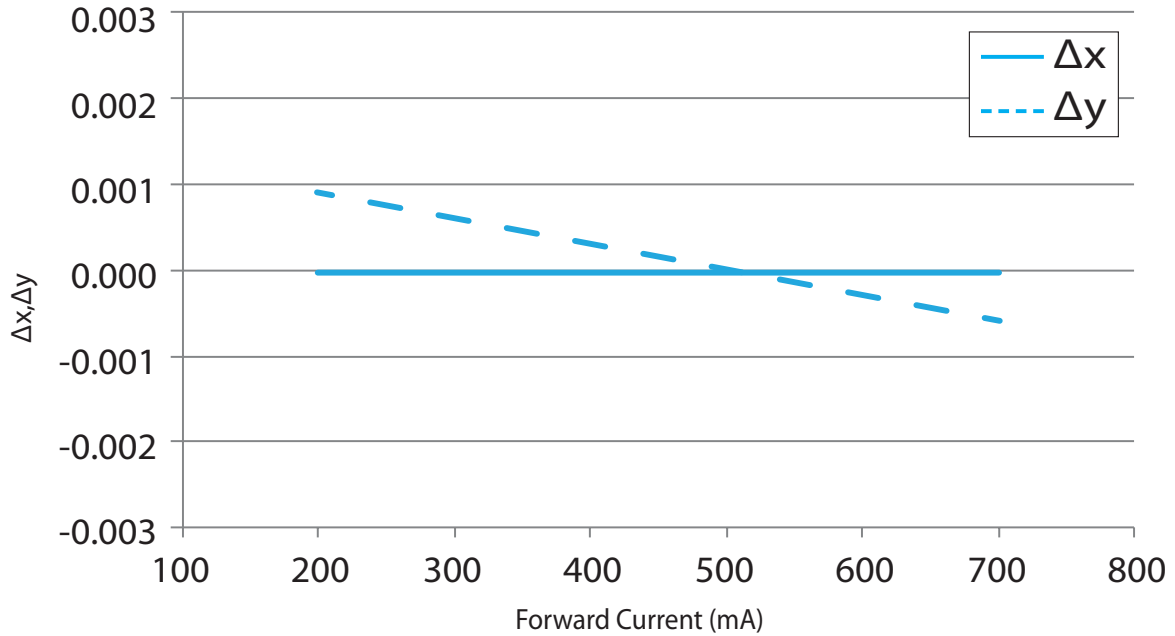
Luminous flux vs. junction temperature for PLCC 3535 1-3W Series

### Forward Voltage vs. Junction Temperature

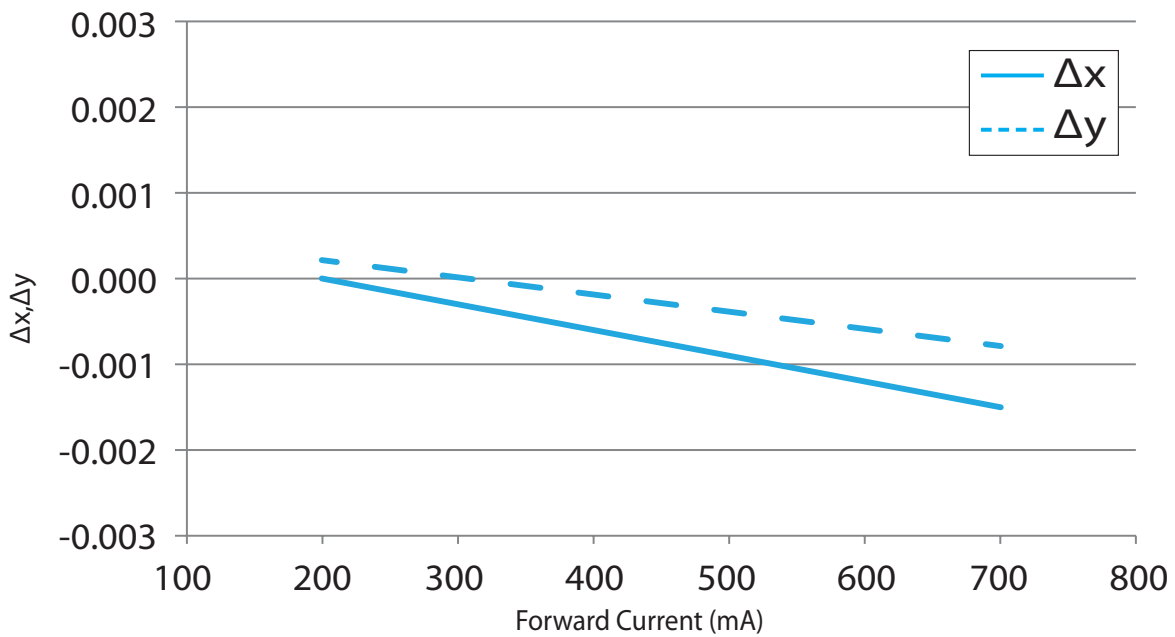


Forward voltage vs. junction temperature for PLCC 3535 1-3W Series

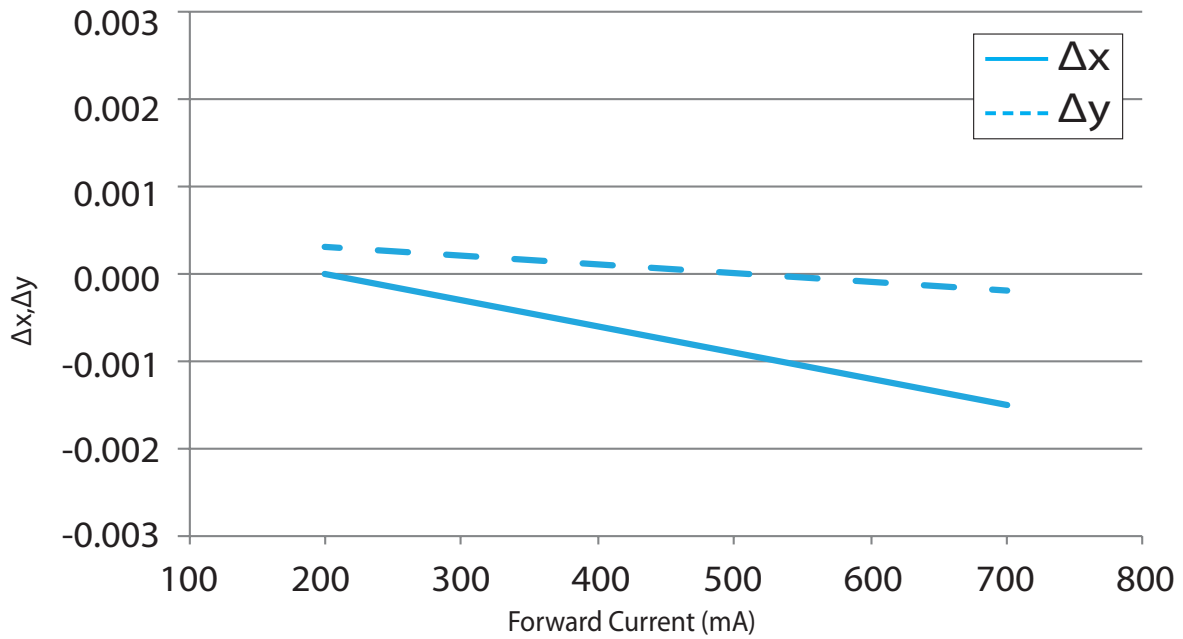
**$\Delta x, \Delta y$  vs. Forward Current**



$\Delta x, \Delta y$  vs. Forward Current for PLCC 3535 1-3W Cool White

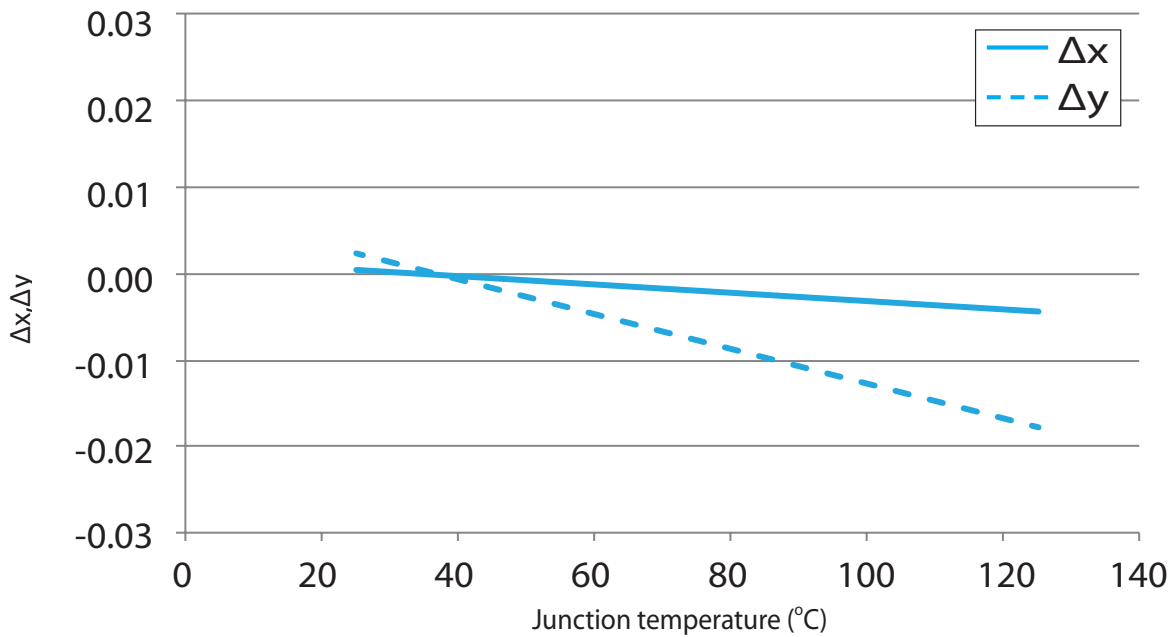


$\Delta x, \Delta y$  vs. Forward Current for PLCC 3535 1-3W Neutral White

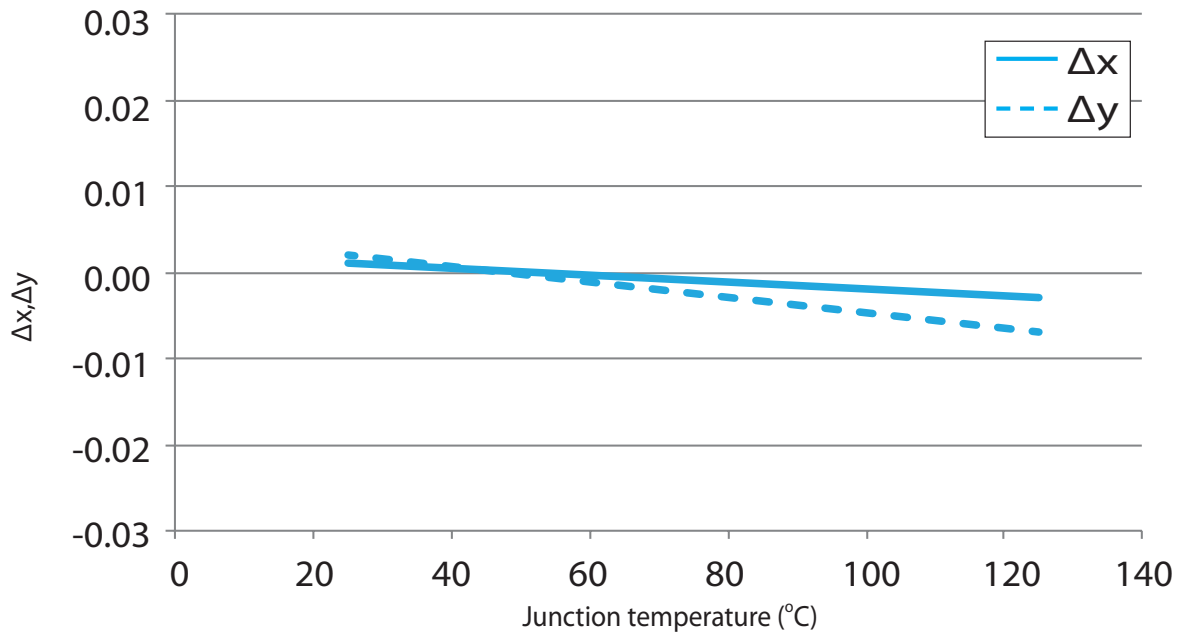


Δx, Δy vs. Forward Current for PLCC 3535 1-3W Warm White

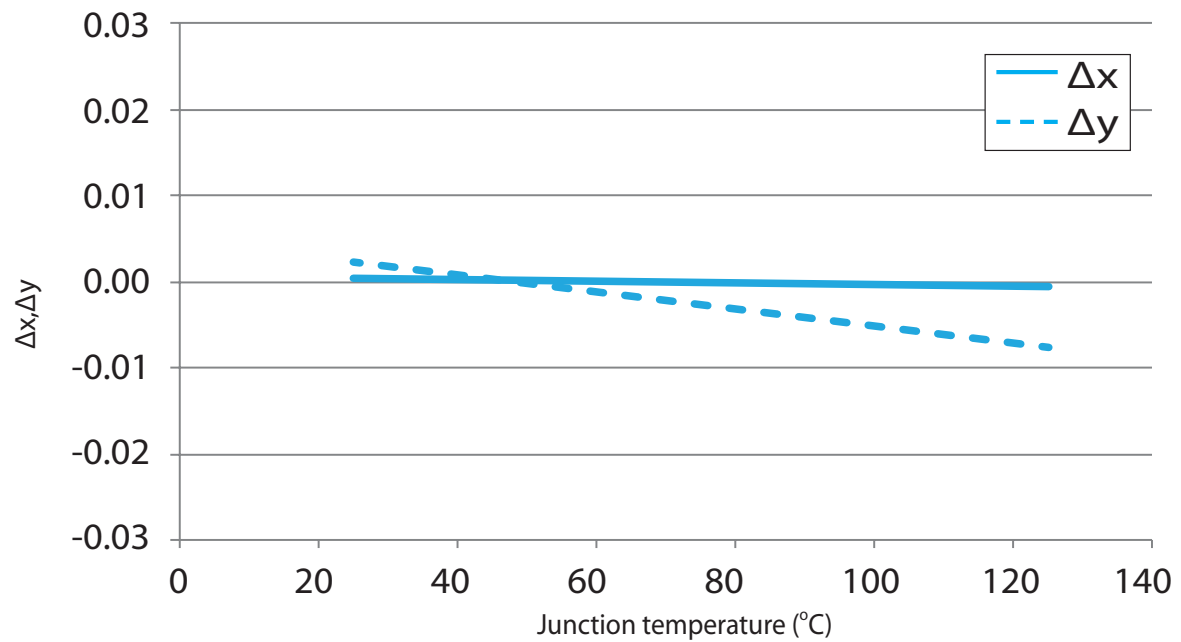
**Δx, Δy vs. Junction Temperature**



Δx, Δy vs. Junction temperature for PLCC 3535 1-3W Cool White

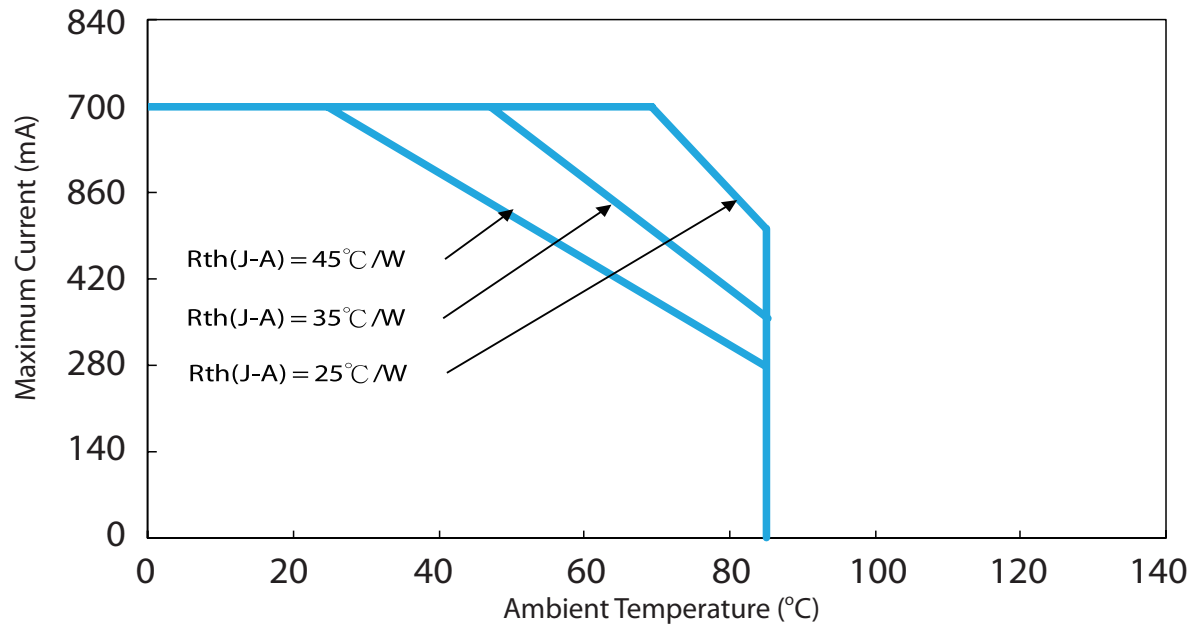


$\Delta x, \Delta y$  vs. Junction temperature for PLCC 3535 1-3W Neutral White



$\Delta x, \Delta y$  vs. Junction temperature for PLCC 3535 1-3W Warm White

### Maximum Current vs. Ambient Temperature

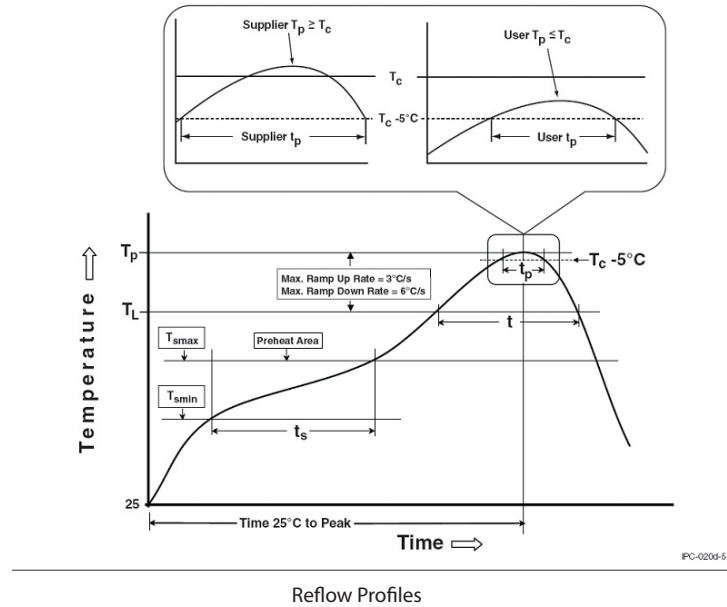


Maximum Current vs. Ambient Temperature for PLCC 3535 1-3W Series



## Reflow Profile

The following reflow profile is from IPC/JEDEC J-STD-020D which provided here for reference.



### Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak	
Temperature min ( $T_{smin}$ )	150 °C
Temperature max ( $T_{smax}$ )	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second max.
Liquidous temperature ( $T_L$ )	217 °C
Time at liquidous ( $t_L$ )	60-150 seconds
Peak package body temperature ( $T_p$ )*	255 °C ~260 °C *
Classification temperature ( $T_c$ )	260 °C
Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_c$ )	30** seconds
Average ramp-down rate ( $T_p$ to $T_{smax}$ )	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

**Notes:**

- \* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.
- \*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

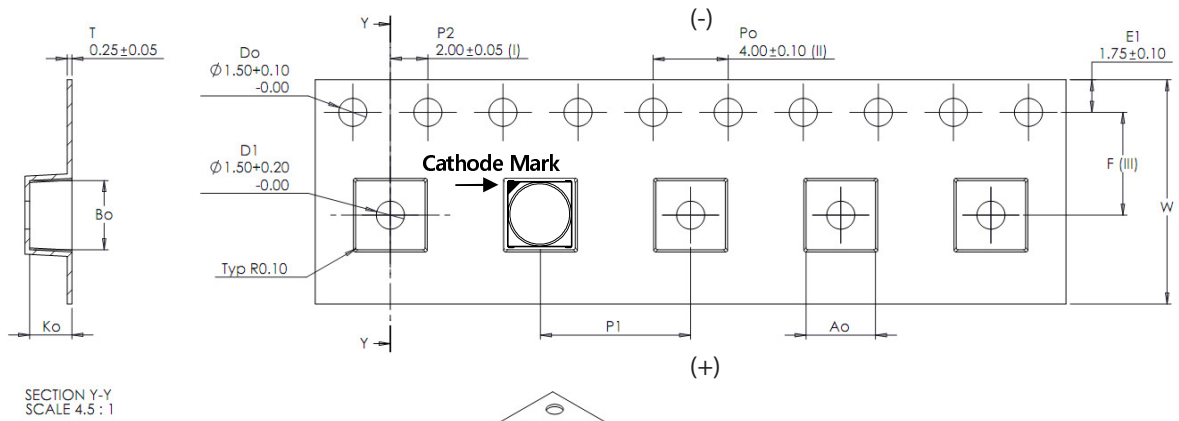
## Reliability

NO .	Test Item	Test Condition	Remark
1	Temperature Cycle	-40°C~100°C 30, 30, mins	100 Cycle
2	Thermal Shock	-40°C~100°C 15, 15 mins $\leq$ 10 sec	100 Cycle
3	Resistance to Soldering Heat	T <sub>SOL</sub> =260°C, 30 sec	3 times
4	Moisture Resistance	25°C~65°C 90% RH 24 hrs / 1 cycle	10 Cycle
5	High-Temperature Storage	T <sub>A</sub> =100°C	1,000 hrs
6	Humidity Heat Storage	T <sub>A</sub> =85°C RH=85%	1,000 hrs
7	Low-Temperature Storage	T <sub>A</sub> =-40°C	1,000 hrs
8	Operation Life test	25°C	1,000 hrs
9	High Temperature Operation Life test	85°C	1,000 hrs
10	High Humidity Heat Life Test	85°C, 85%RH	1,000 hrs
11	ON/OFF Test	30 sec ON, 30 sec OFF	1.5W times

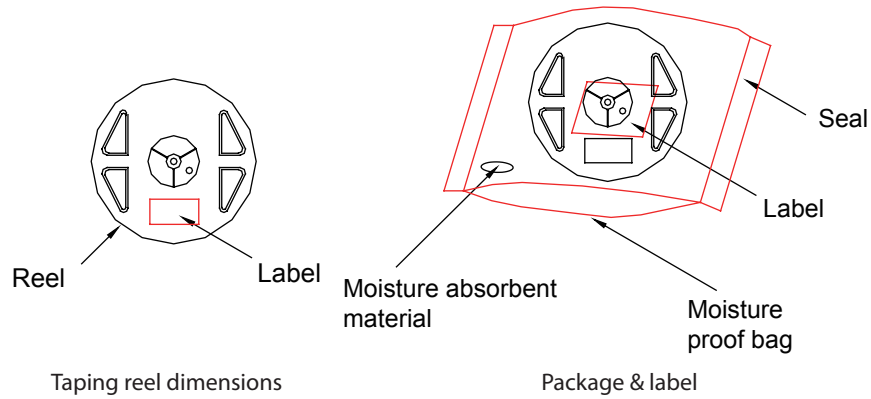
## Failure Criteria

Item	Criteria for Judgment	
	Min.	Max.
Lumen Maintenance	85%	-
$\Delta u'v'$	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 $\mu$ A
Resistance to Soldering Heat	No dead lamps or visual damage	

## Product Packaging Information



Ao	3.70	+/- 0.10
Bo	3.70	+/- 0.10
Ko	2.25	+/- 0.10
F	5.50	+/- 0.05
P1	8.00	+/- 0.10
W	12.00	+0.30/-0.10



Item	Quantity	Total	Dimensions (mm)
Reel	1000pcs	1000pcs	R=180
Bag	1 reels	1000pcs	520*255*285
Starting with 50pcs empty, and 50pcs empty at the end			

## Revision History

Versions	Description	Release Date
1	Establish order code information	2012/11/26
2	Update the Voltage Bin Structure	2013/04/17
3	1. Revise Emitter Type Dimension 2. Update the Characteristic Curve 3. Revise the name of the Datasheet 4. Update the Quantity of product package 5. Update Luminous flux characteristic	2014/05/19
4	Revise Reliability	2014/08/22

## About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at [www.edison-opto.com](http://www.edison-opto.com)

Copyright©2014 Edison Opto. All rights reserved. No part of publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photo copy, recording or any other information storage and retrieval system, without prior permission in writing from the publisher. The information in this publication are subject to change without notice.

[www.edison-opto.com](http://www.edison-opto.com)

For general assistance please contact:  
[service@edison-opto.com.tw](mailto:service@edison-opto.com.tw)

For technical assistance please contact:  
[LED.Detective@edison-opto.com.tw](mailto:LED.Detective@edison-opto.com.tw)